

Application No. 10/656,857
Amendment dated November 4, 2005
Reply to Office Action of September 1, 2005

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (currently amended) A method for modifying electrical properties of papermaking compositions, said method comprising the steps of:

providing at least one papermaking composition comprising a colloid phase, an aqueous phase, and optionally pulp fibers, wherein each of the colloid phase, aqueous phase, and optional pulp fibers of one of the at least one papermaking composition has an electrical property and an associated value based upon the electrical property;

introducing carbon dioxide into at least one of the at least one papermaking composition in an amount ~~such that~~ ; and

substantially adjusting the associated electrical property value is substantially adjusted , wherein said step of substantially adjusting is achieved by performing said step of introducing carbon dioxide.

Claim 2 (original) The method of 1, wherein:

the at least one papermaking composition further comprises solid calcium carbonate;

at least a portion of the solid calcium carbonate is dissolved upon said step of introducing carbon dioxide.

Claim 3 (original) The method of claim 1, further comprising the steps of:

selecting first, second, third, and optional fourth papermaking compositions as the at least one papermaking composition, wherein

the first papermaking composition is a pulp slurry that includes pulp fibers,

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the second papermaking composition is broke that includes pulp fibers,

the third papermaking composition is whitewater which does not include a substantial amount of pulp fibers, and

the optional fourth papermaking composition is a diluted version of the first papermaking composition;

optionally diluting the first papermaking composition thereby providing the optional fourth papermaking composition;

allowing the pulp fibers of the first or optional fourth papermaking composition to be dewatered on a papermaking wire downstream of the vessel, and at which the second and third papermaking compositions are produced.

Claim 4 (original) The method of claim 3, further comprising the steps of:
selecting the first papermaking composition as the at least one papermaking composition into which carbon dioxide is introduced.

Claim 5 (original) The method of claim 3, further comprising the steps of:
selecting the second papermaking composition as the at least one papermaking composition into which carbon dioxide is introduced.

Claim 6 (original) The method of claim 3, further comprising the steps of:
selecting the third papermaking composition as the at least one papermaking composition into which carbon dioxide is introduced.

Claim 7 (original) The method of claim 3, further comprising:
selecting dilution of the first papermaking composition as said step of optionally diluting the first papermaking composition, thereby providing the fourth papermaking composition;

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selecting the provided optional fourth papermaking composition as the at least one papermaking composition into which carbon dioxide is introduced.

Claim 8 (original) The method of claim 3, wherein:

the associated electrical property value is based upon zeta potential.

Claim 9 (original) The method of claim 3, wherein:

the associated electrical property value is based upon conductivity.

Claim 10 (original) The method of claim 3, wherein:

the associated electrical property value is based upon electrical charge demand.

Claim 11 (original) The method of claim 3, wherein:

the associated electrical property value is based upon streaming potential.

Claim 12 (currently amended) ~~The method of claim 1,~~ A method for modifying electrical properties of papermaking compositions, said method comprising the steps of:

providing at least one papermaking composition comprising a colloid phase, an aqueous phase, and optionally pulp fibers, wherein each of the colloid phase, aqueous phase, and optional pulp fibers of one of the at least one papermaking composition has an electrical property and an associated value based upon the electrical property;

introducing carbon dioxide into at least one of the at least one papermaking composition in an amount such that the associated electrical property value is substantially adjusted;

selecting a predetermined value or predetermined range of values based upon the electrical property; and

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measuring the electrical property of at least one of the colloid phase, aqueous phase and optional pulp fibers of at least one of the at least one papermaking composition thereby obtained a measured value, wherein the adjusted value is closer to the predetermined value or range of values than the measured value.

Claim 13 (previously presented) The method of claim 12, further comprising the steps of:

comparing the measured value to the predetermined value or range of values;

selecting an amount of the introduced carbon dioxide based upon said comparing step.

Claim 14 (previously presented) The method of claim 8, wherein:

the associated zeta potential value of at least one of the colloid phase and optional fibers of at least one of the first, second, third and optional fourth papermaking compositions is negative and adjustment thereof renders it less negative.

Claim 15 (previously presented) The method of claim 8, wherein:

the associated zeta potential value of at least one of the colloid phase and optional fibers of at least one of the first, second, third and optional fourth papermaking compositions is positive and adjustment thereof renders it less positive.

Claim 16 (previously presented) The method of claim 9, wherein:

the associated conductivity value of at least one of the colloid phase and optional fibers of at least one of the first, second, third and optional fourth papermaking compositions is increased by the adjustment.

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Claim 17 (previously presented) The method of claim 10, wherein:

the associated conductivity value of at least one of the colloid phase and optional fibers of at least one of the first, second, third and optional fourth papermaking compositions is decreased by the adjustment.

Claim 18 (currently amended) ~~The method of claim 1~~ A method for modifying electrical properties of papermaking compositions, said method comprising the steps of:

providing at least one papermaking composition comprising a colloid phase, an aqueous phase, and optionally pulp fibers, wherein each of the colloid phase, aqueous phase, and optional pulp fibers of one of the at least one papermaking composition has an electrical property and an associated value based upon the electrical property; and

introducing carbon dioxide into at least one of the at least one papermaking composition in an amount such that the associated electrical property value is substantially adjusted, wherein:

the at least one papermaking composition into which carbon dioxide is introduced includes pulp fibers present at a consistency of at least 3%.

Claim 19 (previously presented) The method of claim 8, wherein:

the at least one papermaking composition into which carbon dioxide is introduced includes pulp fibers present at a consistency of at least 3%.

Claim 20 (previously presented) The method of claim 12, wherein:

the at least one papermaking composition into which carbon dioxide is introduced includes pulp fibers present at a consistency of at least 3%.

Claim 21 (previously presented) The method of claim 13, wherein:

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the at least one papermaking composition into which carbon dioxide is introduced includes pulp fibers present at a consistency of at least 3%.

Claim 22 (previously presented) The method of claim 14, wherein:

the at least one papermaking composition into which carbon dioxide is introduced includes pulp fibers present at a consistency of at least 3%.

Claim 23 (previously presented) The method of claim 12, further comprising the step of:

controlling the amount of carbon dioxide introduced with a regulating device, the regulating device performing said comparing step.

Claim 24 (previously presented) The method of claim 21, wherein the regulating device includes a programmable logic controller.

Claim 25 (currently amended) The method of claim 3, further comprising the step of:

selecting dilution of the first papermaking composition as said step of optionally diluting the first papermaking composition, thereby providing the fourth papermaking composition;

providing a pulp chest for providing a supply of the first papermaking composition;

providing a blend chest which receives the first papermaking composition from the pulp chest and blends, wherein said step of selecting dilution is performed at the blend chest to yield the fourth papermaking composition;

providing a machine chest which receives the fourth papermaking composition from the blend chest and dilutes the fourth papermaking composition;

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providing a wire pit which receives the diluted fourth papermaking composition from the machine chest and further dilutes the fourth papermaking composition;

providing a refiner which receives the fourth papermaking composition from the wire pit and deaerates, screens, and/or cleans the fourth papermaking composition;

providing a headbox which receives the fourth papermaking composition and distributes the pulp fibers therein across an upper surface of the paperwire, the headbox being downstream of the pulp chest; and

selecting a point whereat the carbon dioxide is introduced, the selected point being at or downstream of the pulp chest and non-adjacently upstream of the headbox.

Claim 26 (previously presented) The method of claim 3, further comprising the steps of:

selecting zeta potential as the electrical property;

selecting the first papermaking composition as the at least one papermaking composition into which carbon dioxide is introduced;

selecting a consistency of fibers for the first papermaking composition of at least 3%;

selecting a predetermined zeta potential value or range of values;

measuring the zeta potential of at least one of the colloid phase, aqueous phase and optional fibers;

comparing the measured value to the predetermined value or range of values; and

selecting an amount of the introduced carbon dioxide based upon said comparing step.

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Claim 27 (previously presented) The method of claim 3, further comprising the steps of:

- selecting dilution of the first papermaking composition as said step of optionally diluting the first papermaking composition, thereby providing the fourth papermaking composition;
- selecting zeta potential as the electrical property;
- selecting the fourth papermaking composition as the at least one papermaking composition into which carbon dioxide is introduced;
- selecting a predetermined zeta potential value or range of values;
- measuring the zeta potential of at least one of the colloid phase, aqueous phase and optional fibers;
- comparing the measured value to the predetermined value; and
- selecting an amount of the introduced carbon dioxide based upon said comparing step.

Claim 28 (previously presented) The method of claim 3, further comprising the steps of:

- selecting zeta potential as the electrical property;
- selecting the second papermaking composition as the at least one papermaking composition into which carbon dioxide is introduced;
- selecting a predetermined zeta potential value or range of values;
- measuring the zeta potential of at least one of the colloid phase, aqueous phase and optional fibers;
- comparing the measured value to the predetermined value or range of values; and
- selecting an amount of the introduced carbon dioxide based upon said comparing step.

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Claim 29 (previously presented) The method of claim 3, further comprising the steps of:

- selecting zeta potential as the electrical property;
- selecting the third papermaking composition as the at least one papermaking composition into which carbon dioxide is introduced;
- selecting a predetermined zeta potential value or range of values;
- measuring the zeta potential of at least one of the colloid phase, aqueous phase and optional fibers;
- comparing the measured value to the predetermined value or range of values; and
- selecting an amount of the introduced carbon dioxide based upon said comparing step.

Claim 30 (previously presented) The method of claim 3, further comprising the steps of:

- selecting a predetermined value or range of values based upon the electrical property; and
- measuring the electrical property of at least one of the colloid phase, aqueous phase and optional pulp fibers of at least one of the at least one papermaking composition thereby obtained a measured value, wherein the adjusted value is closer to the predetermined value than the measured value.

Claim 31 (previously presented) A method for reducing an amount of chemical additives introduced to a papermaking composition, said method comprising the steps of:

- providing at least one papermaking composition comprising a colloid phase, an aqueous phase, and optionally pulp fibers, wherein each of the colloid phase, aqueous phase, and optional pulp fibers of one of the at least one papermaking

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composition has an electrical property and an associated value based upon the electrical property;

introducing an amount of chemical additives into at least one of the at least one papermaking composition;

introducing an amount of carbon dioxide into the at least one of the at least one papermaking composition into which the chemical additives are introduced while at the same time reducing the amount of the chemical additives, the amount of carbon dioxide is such that the associated electrical property value is substantially adjusted.

Claim 32 (new) A method for modifying electrical properties of broke in a papermaking system, said method comprising the steps of:

providing a papermaking system;

providing broke from said papermaking system, the broke comprising a colloid phase, an aqueous phase, and optionally pulp fibers, wherein each of the colloid phase, aqueous phase, and optional pulp fibers has an electrical property and an associated value based upon the electrical property;

introducing carbon dioxide into the broke in an amount; and

substantially adjusting the associated electrical property value, wherein said step of substantially adjusting is achieved by performing said step of introducing carbon dioxide.